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09/834,403	04/13/2001	Akihiro Ohta	42252/DBP/A400	3647

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EXAMINER	
AKHAVANNIK, HUSSEIN	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 01/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/834,403	OHTA ET AL.	
	Examiner	Art Unit	
	Hussein Akhavannik	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-28 is/are pending in the application.

4a) Of the above claim(s) 4-8 and 11-22 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,9 and 23-28 is/are rejected.

7)☒ Claim(s) 23 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 13 April 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendments to claims 2 and 9 overcome the objections cited in paragraph 2 of the previous office action (mailed 5/19/2004).

Response to Arguments

2. Applicant's argument, see page 15, line 14 to page 16, line of the Remarks, filed 8/23/2004, with respect to 37 CFR 1.75 objection of claims 9 and 10 has been fully considered and is persuasive. The objection of claims 9 and 10 has been withdrawn.

3. Applicant's arguments on page 16, line 22 to page 17, line 5 and page 17, lines 20-24 filed 8/23/2004 have been fully considered but they are not persuasive.

The Applicant alleges, on page 16, line 22 to page 17, line 5, that Wanielik et al do not teach or suggest that the processing of the image data by the image evaluation device to generate target parameters, which can include edge data, is also limited to the solid angle sections. The Examiner respectfully disagrees. In column 2, lines 61-65, Wanielik et al explain that "further values such as the depolarization degree etc. of detected targets, the *pixel brightness and possibly the color on the image evaluation devices* as target parameters can be determined." In the first embodiment (column 2, line 56 to column 3, line 30), Wanielik et al refer to the processing of the radar data as the initial processing to determine initial target parameters and the processing of the image data as the further processing. Therefore, the "further processing of parameters from the image evaluation device" in column 3, lines 15-20 refers to the processing of the data from the image evaluation device. Wanielik et al explain that the further processing is performed "[i]f necessary" in column 2, lines 61-62. The Applicant is correct in stating that further processing

includes "target classification, for example, by differentiating between the classes such as obstacle, preceding vehicle, roadway edge, traffic signals, and the like." However, in column 2, line 65 to column 7, line 2, Wanielik et al explain that this further processing is performed on the data from the image evaluation devices, including "*pixel brightness and possible the color on the image evaluation devices.*" Therefore, *all* of the processing of the data from the image sensor, including edge detection as suggested by Raboisson et al, is performed as the "further processing" in the system of Wanielik et al, which is limited to the solid angle section in which target echo signals are detected (column 3, lines 15-20).

The Applicant alleges, on page 17, lines 20-24, that any detection of targets taught by Raboisson et al is based on the detection of road edges and, therefore, Raboisson et al do not teach or suggest detecting objects based on the edge detection of the objects themselves. The Examiner respectfully disagrees. The objects of interest in the system of Raboisson et al are the road edges, which are determined using the edge data from the source image frame, as illustrated by Raboisson et al in figure 3. Independent claims 1, 2, 9, 23, 25, and 27 only require "detecting a target based on said edge data," which is precisely what the system of Raboisson et al is performing by detecting the road contour. The independent claims of the instant application do not require that the target be an automobile or building.

Election/Restrictions

4. Claims 4-8 and 11-22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected species 2 to 10, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 5.

Claim Objections

5. Claim 23 is objected to because of the following informalities: In line 11, "means restricting" should be changed to "means for restricting".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-2 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanielik et al in view of Raboisson et al (U.S. Patent No. 5,706,355).

Referring to claim 1,

i. A radar is illustrated by Wanielik et al in figure 1 by the radar sensor 2.

ii. An image acquisition unit area is illustrated by Wanielik et al in figure 1 by the image sensor 4.

iii. A processing unit for specifying an area of image recognition based on the data output from the radar is illustrated by Wanielik et al in figure 1 by the selection device 8 and is explained in column 3, lines 15-25. Wanielik et al explain that the area specified for further processing is the solid angle sections in which the radar sensor detects echo signals.

iv. Extracting the edge data from the image data output from the image acquisition unit only for the specified area is not explicitly explained by Wanielik et al. Raboisson et

al explain extracting significant edges in order to characterize a region imaged in column 5, lines 20-46. The region of interest in the system of Raboisson et al is the road contour, which is determined using the edges detected from an input image, as illustrated in figure 3.

v. Detecting a target based on the edge data is explained by Wanielik et al in column 3, lines 2-7 by detecting a target (such as an obstacle, a preceding vehicle, *roadway edge* or traffic signal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extract edge data from image data and detect a target based on the edge data as explained by Raboisson et al in the target detection system of Wanielik et al because both systems are directed towards detecting and classifying hazards surrounding a vehicle using image information and the teaching of Raboisson et al provides a well-known and accurate method of target detection to the system of Wanielik et al.

Referring to claim 2,

i. A radar for scanning a specified area and outputting a power signal corresponding to an object scanned is illustrated by Wanielik et al in figure 1 by the radar sensor 2. Wanielik et al do not explicitly explain that the power of the radar is outputted, however, it is inherent that radar systems output power levels depending on echo levels detected (as explained by Wanielik et al in column 3, lines 19-20).

ii. An image acquisition unit for acquiring an image of the specified area is illustrated by Wanielik et al in figure 1 by the image sensor 4.

iii. A processing unit for specifying an area of image recognition based on the power signal output from the radar is illustrated by Wanielik et al in figure 1 by the selection device 8 and is explained in column 3, lines 15-25. Wanielik et al explain that the area specified for further processing is the solid angle sections in which the radar sensor detects echo signals (corresponding to the power signal as explained in section i).

iv. Extracting the edge data from the image data output from the image acquisition unit only for the specified area is not explicitly explained by Wanielik et al. Raboisson et al explain extracting significant edges in order to characterize a region imaged in column 5, lines 20-46. The region of interest in the system of Raboisson et al is the road contour, which is determined using the edges detected from an input image, as illustrated in figure 3.

v. Detecting a target based on the edge data is explained by Wanielik et al in column 3, lines 2-7 by detecting a target (such as an obstacle, a preceding vehicle, *roadway edge* or traffic signal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extract edge data from image data and detect a target based on the edge data as explained by Raboisson et al in the target detection system of Wanielik et al because both systems are directed towards detecting and classifying hazards surrounding a vehicle using image information and the teaching of Raboisson et al provides a well-known and accurate method of target detection to the system of Wanielik et al.

Referring to claim 9,

i. A radar for scanning a specified area and outputting a power signal corresponding to an object scanned is illustrated by Wanielik et al in figure 1 by the radar sensor 2. Wanielik et al do not explicitly explain that the power of the radar is outputted, however, it is inherent that radar systems output power levels depending on echo levels detected (as explained by Wanielik et al in column 3, lines 19-20).

ii. An image acquisition unit for acquiring an image of the specified area is illustrated by Wanielik et al in figure 1 by the image sensor 4.

iii. A processing unit for extracting the edge data from the image data output from the image acquisition unit is not explicitly explained by Wanielik et al. Raboisson et al explain extracting significant edges in order to characterize a region imaged in column 5, lines 20-46. The region of interest in the system of Raboisson et al is the road contour, which is determined using the edges detected from an input image, as illustrated in figure 3.

iv. Specifying an area of image recognition based on the power signal output from the radar is illustrated by Wanielik et al in figure 1 by the selection device 8 and is explained in column 3, lines 15-25. Wanielik et al explain that the area specified for further processing is the solid angle sections in which the radar sensor detects echo signals (corresponding to the power signal as explained in section i).

v. Detecting a target based on the edge data existing in the specified area is explained by Wanielik et al in column 3, lines 2-7 by detecting a target (such as an obstacle, a preceding vehicle, *roadway edge* or traffic signal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extract edge data from image data and detect a target based on the edge data as explained by Raboisson et al in the target detection system of Wanielik et al because both systems are directed towards detecting and classifying hazards surrounding a vehicle using image information and the teaching of Raboisson et al provides a well-known and accurate method of target detection to the system of Wanielik et al.

8. Claims 3, 10, and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanielik et al in view of Raboisson et al, and further in view of Holmes (U.S. Patent No. 5,430,450).

Referring to claim 3, which is representative of claim 10, the processing unit specifying an area having the power not less than a predetermined level as the image recognition area is not explicitly explained by Wanielik et al or Raboisson et al. However, Holmes explains detecting an object from the power level of a radar signal by thresholding the power level in column 2, lines 44-50. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify an area having the power not less than a predetermined level as the image recognition area as explained by Holmes in the target recognition system of Wanielik et al and Raboisson et al because false detections would be avoided, thereby increasing the accuracy of the object detection and recognition.

Referring to claim 23,

i. Means for scanning a particular area and outputting power signals in response is illustrated by Wanielik et al in figure 1 by the radar sensor 2. Wanielik et al do not explicitly explain that the power of the radar is outputted, however, it is inherent that

radar systems output power levels depending on echo levels detected (as explained by Wanielik et al in column 3, lines 19-20).

ii. Means for acquiring image data associated with the particular area is illustrated by Wanielik et al in figure 1 by the image sensor 4.

iii. Means for identifying a portion of the particular area for which a power signal having at least a threshold magnitude is output is not explicitly explained by Wanielik et al. However, Holmes explains detecting an object from the power level of a radar signal by thresholding the power level in column 2, lines 44-50. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify an area having the power not less than a predetermined level as the image recognition area as explained by Holmes in the target recognition system of Wanielik et al because false detections would be avoided, thereby increasing the accuracy of the object detection and recognition.

iv. Means for assigning the identified portion as a search area is illustrated by Wanielik et al in figure 1 by the selection device 8 and is explained in column 3, lines 15-25. Wanielik et al explain that the area specified for further processing is the solid angle sections in which the radar sensor detects echo signals.

v. Means for restricting extraction of the edge image data to the search area is not explicitly explained by Wanielik et al or Holmes. Raboisson et al explain extracting significant edges in order to characterize a region imaged in column 5, lines 20-46. The region of interest in the system of Raboisson et al is the road contour, which is determined using the edges detected from an input image, as illustrated in figure 3.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extract edge data from image data and detect a target based on the edge data as explained by Raboisson et al in the target detection system of Wanielik et al and Holmes because both systems are directed towards detecting and classifying hazards surrounding a vehicle using image information and the teaching of Raboisson et al provides a well-known and accurate method of target detection to the system of Wanielik et al.

Referring to claim 25,

i. A radar scanning a particular area and outputting power signals in response is illustrated by Wanielik et al in figure 1 by the radar sensor 2. Wanielik et al do not explicitly explain that the power of the radar is outputted, however, it is inherent that radar systems output power levels depending on echo levels detected (as explained by Wanielik et al in column 3, lines 19-20).

ii. An image acquisition unit acquiring image data associated with the particular area is illustrated by Wanielik et al in figure 1 by the image sensor 4.

iii. A processing unit identifying a portion of the particular area for which a power signal having at least a threshold magnitude is output is not explicitly explained by Wanielik et al. However, Holmes explains detecting an object from the power level of a radar signal by thresholding the power level in column 2, lines 44-50. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify an area having the power not less than a predetermined level as the image recognition area as explained by Holmes in the target recognition system of

Wanielik et al because false detections would be avoided, thereby increasing the accuracy of the object detection and recognition.

iv. The processing unit further assigning the identified portion as a search area and restricting extraction of edge image data to the search area is not explicitly explained by Wanielik et al or Holmes. Wanielik et al do illustrate in figure 1 by the selection device 8 and explain in column 3, lines 15-25 that the area specified for further processing is the solid angle sections in which the radar sensor detects echo signals. However, Wanielik et al do not explain extracting edge image data. Raboisson et al explain extracting significant edges in order to characterize a region imaged in column 5, lines 20-46. The region of interest in the system of Raboisson et al is the road contour, which is determined using the edges detected from an input image, as illustrated in figure 3. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to extract edge data from image data and detect a target based on the edge data as explained by Raboisson et al in the target detection system of Wanielik et al and Holmes because both systems are directed towards detecting and classifying hazards surrounding a vehicle using image information and the teaching of Raboisson et al provides a well-known and accurate method of target detection to the system of Wanielik et al.

Referring to claim 27,

i. A radar scanning a particular area and outputting power signals in response corresponds to claim 25i.

ii. An image acquisition unit acquiring image data associated with the particular area corresponds to claim 25ii.

iii. A processing unit identifying a portion of the particular area for which a power signal having at least a threshold magnitude is output corresponds to claim 25iii.

iv. The processing unit further assigning the identified portion as a search area and extracting edge data from the image data acquired for the search area corresponds to claim 25iv.

v. Detecting a target based on the edge data is explained by Wanielik et al in column 3, lines 2-7 by detecting a target (such as an obstacle, a preceding vehicle, *roadway edge* or traffic signal).

Referring to claim 24, which is representative of claims 26 and 28, the identified portion being a portion smaller than the whole particular area is not explicitly explained by Wanielik et al or Raboisson et al. However, Holmes illustrates that only points 300 and 302 are identified as being above a threshold (the dotted line) from the radar signals collected in figure 3B and explains those points being significant objects in column 5, lines 23-26.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Ohta (U.S. Patent No. 6,763,125) – To exhibit detecting an object using edges extracted from an image as explained in the abstract.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hussein Akhavannik whose telephone number is (703)306-4049. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703)305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hussein Akhavannik HA.
January 8, 2005

ANDREW W. JOHNS
PRIMARY EXAMINER